Federal Democratic Republic of Ethiopia

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ET 480 (2000) (English): TESTING COATED SEEDS

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ETHIOPIAN STANDARD

ES 480:2000

(Reaffirmed :2012)

First edition

Testing coated seeds

ICS: 65.020.20

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Foreword

This Ethiopian Standard has been prepared under the direction of Technical Committee for seeds (TC 16) and published by the Ethiopian Standards Agency (ESA).
The technical contents in the text of this Standard are identical with ES 480:2000 edition while the reissued standard carries some editorial and technical changes observed in the course of systematic review.

Acknowledgement has been made for the use of the indicated publication.
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Testing coated seeds

1 Scope

This Ethiopian Standard specifies methods of sampling, purity, verification of species, number of other seeds, germination test, weight and size of coated seed pellets, encrusted seed, seed granules, seed tapes, seed mats and treated seeds.

2 Normative references

The following standard contain provision which, through reference in this text, constitute provision of this Ethiopian Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this Ethiopian Standard are encouraged to investigate the possibility of applying the most recent editions of the Ethiopian Standards indicated below. Registers of currently valid standards are maintained in the Quality and Standards Authority of Ethiopia.

ES 413:2000, *Seeds – Terminology*.

ES 471:2000, *Seeds – Sampling.*

ES 472:2000*, Seeds – Purity analysis.*

ES 473:2000*, Seeds – Determination of other seed crops.*

ES 474:2000*, Seeds – Germination test.*

ES 475:2000*, Seeds – Biochemical test for viability.*

ES 476:2000*, Seeds – Determination of seed health.*

ES 477:2000, *Seeds – Verification of species and cultivars*.

ES 478:2000*, Seeds – Determination of moisture content.*

3 Definitions

For the purpose or this standard, the definitions in ES 413 and the following shall apply.

3.1
seed pellets
more or less spherical units developed for precisions sowing, usually incorporating a single seed with the size and shape of the seed no longer readily evident. The pellet, in addition to the pelleting material, may contain pesticides, dyes or other additives

3.2
encrusted seed
units more or less retaining the shape of the seed with the size and weight changed to a greater or lesser extent. The encrusting material may contain pesticides, fungicides, dyes or other additives

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3.3
seed tapes

narrow bands of material, such as paper or other degradable material, with seeds spaced randomly, in group or in a single row

3.4
seed mats

broad sheets of material, such as paper or other degradable material, with seeds placed in rows, group or at random through the sheets

3.5
treated seed

seed to which only pesticides, dyes or other additives have been applied which have not resulted in a significant change in size, shape or addition to the weight of the original seed and which can still be tested in accordance, with Table 1

3.6 Pure pellets

3.6.1 pure pellets include:

a) The entire pellets regardless of whether or not they contain seed

b) Broken and damaged pellets in which more than half the surface of the seed is covered by pelleting material, except when it is obvious that either the seed is not of the species stated by the sender (clause 3.6.2) or there is no seed present (clause 3.6.3)

3.6.2 Unpelleted seed include:

a) Free seeds of any species.

b) Broken pellets containing a seed that is recognisably not of the species stated by the sender.

3.6.3 Inert matter

Inert matter shall include

a) Loose pelleting material

b) Broken pellets in which it is obvious that there is no seed

c) Any other material defined as inert matter in ES 413.

4 Sampling

4.1 Size of lot

Providing there is satisfactory evidence that the lot is reasonably homogeneous, the maximum weight of lot may be as great as the maximum weight of lot for which sampling methods have been specified in accordance with ES 471 subject to the tolerance of 5% and subject to the seed number limitation may contain1, 000,000,000 (10,000 units of 100, 000). However, the weight of the lot, including the coating material may not exceed 42,000 kg (40,060 kg plus 5%).

4.2 Size of submitted sample

Submitted samples shall contain not less than the number of seed pellets or seed tapes indicated in column 2 of Table 1 and Table 2. If a smaller sample is used the following statement must be inserted on the certificate. The sample submitted contained only pellets (seeds) and is not in accordance with the standard requirement of ES 471.

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Table -- 1 Submitted sample size of pelleted seeds given in number of pellets

Ser. No.	Determinations	Submitted samples not less than	Working samples not less than	Methed of test
1	Purity analysis (including verification of species)	7,500	2,500	ES 472
2	Weight determination	7,500	pure pellet fraction	ES 479
3	Germination	7,500	400	ES 474
4	Determination of other seed species by number	10,000	7,500	ES 473
5	Determination of other seed species by number, (encrusted seeds and seed granules)	25,000	25,000	ES 473
6	Size grading	10,000	2,000	ES 472

Table -- 2 Sample size of seed tapes

Ser. No.	Determination	Submitted seeds amples not less than	Working seed samples not less than	Methed of test
1	Seed-Verification of species and cultivars	2,500 seeds	100 seeds	ES 477
2	Seed - Germination	2,500 "	400 "	ES 474
3	Seed - Purity analysis (if required)	2,500 "	2,500 "	ES 472
4	Seed - Determination of other seed species by number	10,000"	7,500 "	ES 473

4.3 Drawing and Disposal of submitted samples

As submitted samples of coated seeds normally contain fewer seeds than corresponding samples of uncoated seeds, special care is necessary in drawing the sample to ensure that it is representative of the lot. Precautions are necessary to avoid damage to or change in the pellets or seed tape during drawing, handling and transport, and samples must be submitted in suitable containers.

4.4 Size of working sample

Working samples shall contain not less than the number of pellets or seeds indicated in column 3 of Table 1, and Table 2. If a smaller sample is used the actual number of pellets or seeds in the sample shall be reported on the Analysis Certificate.

4.5 Obtaining the working sample

For pelleted seeds use one of the dividers (Mechanical divider, random cups, modified halving and spoon method). However, the distance fall must never exceed that indicated in table 1. For seed tapes taken pieces of tape at random, to provide sufficient seeds for the test.

5 Purity analysis of coated seed

5.1 Scope: A purity analysis in the strict sense (i.e. of the seeds inside the pellets and tapes) is not obligatory through, if requested by the sender, a purity analysis on depelleted seeds or seed removed from tape may be carried out in accordance with ES 472. Separations for pelleted seed are defined in clause 3.6 here in. But for tapped seed no separation is made.

6 General principles

The working sample of pellets is separated into the following three components:

a) Pure pellets;

b) Unpelleted seed; and

c) Inter matter, and the percentage of each part is determined by weight.

All species of seed and each kind of inert matter present shall be identified as far as possible and, if required for reporting, its percentage by weight determined.

7 Verification of species

In order to check that the seed in the pellets is largely of the species stated by the sender, it is obligatory to remove the pelleting material from 100 pellets taken from the pure pellet fraction of the purity test and determine the species of each seed. The pelleting material may be washed off or removed in the dry state. Similarly 100 seeds must be removed from tapes and the identity of each seed determined.

8 Procedure

8.1 Working sample

For pellets the purity analysis shall be made on a working sample taken from the submitted sample in accordance with clause 4.5. The size of the working sample shall be that indicated in column 3 of Table 1. The analysis may be made on one working sample of this number of pellets or on two sub-samples of at least half this number each independently drawn. The working sample (or each sub-sample) shall be weighed in grams to the minimum number of decimal places necessary to calculate the percentage of its component parts to one decimal place.

The number of decimal places necessary for weighing, in order to calculate percentages to one decimal place, is indicated below.

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Weight of working sample in grams	Number of decimal places
Less than 1.00	4
1.000 to 9.999	3
10.00 to 99.99	2
100.00 to 999.9	1
1000 or >	0

8.2 Separation

The working sample of pellets (or sub-sample) after weighing shall be separated into its components as defined in clause 4.2.

8.3 Calculation and expression of results

The percentage by weight of each of the component parts in clause 4.2 shall be calculated to one decimal place. The percentage of seed of any particular unpelleted species or of any particular kind of inert matter need not be calculated except as required by ES 472. Percentages must be based on the sum of the weights of the components, not on the original weight of the working sample, but the sum of the weights of components must be compared to the original weight as a check against loss of material or other error. If a duplicate analysis is made of two half-working samples, the difference must not exceed the tolerance between duplicate analysed given in ES 472. If the difference is in excess of the tolerance employ the procedure laid down in ES 472.

8.4 Test result

The test result shall include the following particulars:

The result of a purity analysis shall be given to one decimal place and the percentage of all components must total 100. Components of less than 0.05% shall be reported as ‘trace’.

The name and number of seeds of each species found in the examination of the 1200 seeds removed from pellets or tapes shall be reported on the certificates under the determinations.

The percentages of pure pellets, unpelleted seed and inert matter must be reported.

9 Determinations of number of other seed species and cultivars

9.1 Scope

This is, to estimate the number of seeds of other species, carried out only at the request of the sender.

Definitions in determining the number of other seeds, the definition prescribed in ES 413 shall be observed. Other seeds refer to species other than that of the pure seed as defined in ES 413.

9.2 General principles

The determination is made by a count of seeds of the species (or groups of species) designated by the sender, and the result is expressed as a number of such seeds found in the weight and approximate numbers of pellets examined or for tapes in the length of tape (or area of mat) examined.

9.3 Procedure

9.3.1 Working sample

The working sample shall be not less than that prescribed, in column 3 of Table 1, and Table 2 here in. The working sample of pellets may be divided into two sub-samples.

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9.3.2 Determination

Procedures for purity tests on depleted seeds and seeds removed from tapes.

When a purity test on depleted seeds is to be undertaken at the request of the sender the working sample of not less than 2500 pellets and the pelleting material and/ or tape material shall be depleted by shaking in fine mesh sieves immersed in water. A sieve of 1.00-mm mesh above a sieve of 0.5 mm is recommended. The pelleting material is dispersed in the water and the remaining seed material is dried overnight on filter paper and then subject to an air oven following the procedure prescribed in ES 478 clause 7.6 and 7.7 for the species under test. After drying, the material shall be subjected to a purity analysis in accordance with ES 472.

When a purity test on seeds removed from tapes is requested, the tape material of the working sample with paper tapes is consciously separated and stripped off. Water soluble tape material is moistened until the seeds come free. When seeds are found in the tapes, the procedure described in the clause 9.3.2 shall be applied. The moistened seeds shall be dried and the freed seed material shall be subjected to a purity test.

However, in both cases drying shall not be obligatory. The working sample is searched either for seeds of all other species or of certain designated species, as required by the sender.

9.3.3 Calculation and expression of results

The result is expressed as the number of seeds belonging to each designated species or category found in the pelleted actual weight and approximate number of seeds examined and for seed tapes the length of tape (or area of mat) examined. In addition the number per unit weight, per unit length or per unit area (e.g. per kilogram, per meter or per square meter) may be calculated. To decide whether two determinations, made in the same station or in different stations are significantly different, use the ES 472, of the attached annex table of tolerance. The two samples compared must be of approximately the same weight, length or area.

10 Test report

The test report include the following information:

The actual weight and approximate number of pelleted seeds and/or the length of tape (or area of mat) examined and the Latin name and number of seeds of each species sought and found in this weight, length or area shall be reported on the Analysis Certificate, notwithstanding that the result may in addition be expressed in some other way (e.g. number of seeds per kilogram, per meter or per square meter.

11 The germination test

11.1 Scope

This germination test is to determine the percentage by number of normal seedlings as defined in clause 3.3 of the kind of seed of which the sample purports to be using pellets from the pure pellet fraction or tape without removing the seeds from the tape material. An additional germination test on pure seed removed from the pellets or tape may be carried out at the request of the sender or as a check on a test of pellets or tapes. Care must be taken that the covering material is removed in such a way as not to affect the germination capacity of the seeds.

12 Definitions

Evaluation of seedlings as normal or abnormal shall be determined in accordance with 303. A pellet is regarded as having germinated if it produces at least one normal seedling of the species stated by the sender. Seedlings that are obviously not of the species stated by the sender, even if normal for their species, are not included in the germination figure but their number shall be reported separately.

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13 General principles

Germination tests on pelleted seeds shall be made with pellets from the pure pellet fraction of a purity test. The pellets shall be placed on the substrate in the condition in which they are received (e.g. without rinsing or soaking). Germination tests on seed tapes are made on the tape without removing the seeds from the tape material or in any way pre treating the tape.

14 Materials

Paper, sand and in certain situation soil are permissible as substrates. For pelleted seed the use of pleated paper, and for seed tapes a between paper method of which the upright rolled towel has proved satisfactory in many cases, is recommended.

15 Apparatus

The apparatus in ES 472 shall be used.

15.1.1 Working sample

The pure pellets shall be well mixed and 400 pellets counted at random in replicates of 100. The working sample from seed tapes shall consist of randomly taken pieces of tape to make up four replicates of at least 100 seeds each.

15.1.2 Test conditions

Methods, substrates, temperatures, light conditions and special treatments shall be used as described ES 476.

15.1.3 Special treatments for breaking dormancy

When fresh ungerminated seeds remain at the end of the test period, complete germination shall be obtained by retesting after a period of dry storage.

15.1.4 Duration of test

Extension beyond the period prescribed in the ES 474 clause may be necessary. However, slow germination may be an indication that test conditions are not optimum and a germination test of seeds removed from the covering material may be made as a check.

15.1.5 Evaluation

Evaluation of seedlings as normal or abnormal shall be in accordance with the definitions given in the ES 413 and ES 474 Abnormality may on occasion be due to the pelting or tape material and when this is suspected retest shall be carried out in soil of good quality at appropriate temperature and under favourable conditions of moisture and light.

15.1.6 Multiple seed structures

Multiple seed structures may occur in pellets or in tapes or more than one seed may be found in a pellet. In either case these shall be tested as single seeds.

The result of the test indicates the percentage of structures or pellets which have produced at least one normal seedling. Pellets or seeds in tapes producing two or more such seedlings are counted and their number recorded.

When pellets are tested for monogermity the numbers of pellets which have produced either one, two, or more than two normal seedlings are determined in germination test and each is expressed as a percentage of the total number of pellets producing at least one normal seedlings.

16 Calculation and expression of results

Number expresses results as percentage. In addition, for taped seeds the total length of tape (or area of mat) used in the germination test is measured and the total number of normal seedlings is noted. From these data the number of normal seedlings per meter (or square meter) is calculated.

17 Test result

The test result shall include the following information:

The percentage of pellets or seed in tapes with normal seedling, with abnormal seedlings and without seedlings shall be reported on the Analysis Certificate. The method used for the germination test and the duration of the test must be indicated. In addition for seed tapes the number of normal seedlings per meter of tape (or square meter of mat) shall the reported.

18 Weight determination and size grading of pallet seed

Because of the technical requirements of precision drilling, weight determination or size grading may be necessary.

18.1 Scope

This test is to determine the weight per 1000 pellets and/or size grading of the sample as submitted.

18.2 Principles

For a weight determination the number of pellets in a weighed quantity of pure pellets is counted and the

Weight per 1000 calculated. For size determination a sample of the size specified in clause 22 is screened as specified and the percentage of each screening fraction determined.

19 Apparatus

The following apparatus shall be used:

a) For weight determination a suitable counting machine or counting equipment may be used;

b) For size determination a suitable screening machine is used.

20 Procedure

For weight determination follow the procedure prescribed in the ES 479. To determine the pelleted size of the seeds on a sample weighing at least 250 g, working samples of about 50 g (not less than 45 g and not more than 55 g) each shall be used. Each sample shall be subjected to a screening analysis.

The following round whole screens shall be used.

One screen with a whole diameter 0.25 mm smaller than the lower nominal value of the seed size.

One set of screens which divides the stated seeds size range into quarter millimetres fractions.

One screen with a whole diameter 0.25 mm larger than the upper nominal value of the seed size. Thus, the screening fractions (including the portion passing through the lowest screen) shall be weighed to (two decimal places). The weights of the fractions are expressed as percentages (one decimal place) of the total weight. The average of the values of each of the two working samples represents the results of the analysis, provided that, the difference between the sums of the percentages within the nominal grading limits does not exceed

1.5%. If this tolerance is exceeded, a further sample of 50 g (and if necessary a fourth sample) shall be analysed.

21 Certificates

An International seed analysis certificate shall be issued only by the official seed testing authority or agencies.

21.1 Test result

The test results of coated, seed analysis shall be clearly marked in the space following the heading ANALYSIS RESULTS with the words ‘SEED PELLETS, ENCRUSTED SEEDS, SEED GRANULES, SEED TAPES OR SEED MATS’. The name and number of seeds of each species found in the verification of species examined shall be reported.

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Ethiopian Standards Agency

Organization and Objectives

The Ethiopian Standards Agency (ESA) is the national standards body of Ethiopia established in 2010 based on regulation No. 193/2010.ESA is established due to the restructuring of Quality and Standards Authority of Ethiopia (QSAE) which was established in 1970.

ESA's objectives are:-

- Develop Ethiopian standards and establish a system that enable to check weather goods and services are in compliance with the required standards,
- Facilitate the country's technology transfer through the use of standards,
- Develop national standards for local products and services so as to make them competitive in the international market.

Ethiopian Standards

The Ethiopian Standards are developed by national technical committees which are composed of different stakeholders consisting of educational Institutions, research institutes, government organizations, certification, inspection, and testing organizations, regulatory bodies, consumer association etc. The requirements and/ or recommendations contained in Ethiopian Standards are consensus based that reflects the interest of the TC representatives and also of comments received from the public and other sources. Ethiopian Standards are approved by the National Standardization Council and are kept under continuous review after publication and updated regularly to take account of latest scientific and technological changes.
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International Involvement
ESA, representing Ethiopia, is a member of the International Organization for Standardization (ISO), and Codex Alimentarius Commission (CODEX). It also maintains close working relations with the international Electro-technical Commission (IEC) and American Society for Testing and Materials (ASTM).It is a founding member of the African Regional Organization for standardization (ARSO).

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